

## AIR WAR OVER EUROPE

By KURT FISCHER

*Here are some technical details and figures on the air war over Europe which are not generally known and which show the extraordinary proportions this war has assumed during the last few months. The author is a staff member of the magazine.*

ON September 4, 1939, some forty hours after Britain's declaration of war on the Reich, the British Air Force dropped the first bombs on German territory. This raid on Wilhelmshaven and points on the lower Elbe was followed by further British raids, chiefly on Western Germany, during the Polish campaign. Little damage was done, and it is probable that the raids were meant only as a sop to the Poles. Another series of attacks began in December 1939, leading on January 12, 1940, to the bombing of the seaside resort of Westerland on the island of Sylt.

In May 1940 British raids increased in number and severity, the first night attack being carried out on May 10. By the end of that month, the number of British raids on German territory had mounted to 393, of which 276 had been directed at nonmilitary objectives, claiming more than five hundred dead and wounded among the civilian population. This went on till June 20, without a single German bomb having fallen on British soil—except for the silencing of a coastal antiaircraft battery on March 16 during a German raid on British warships off the Orkney Islands—and without a single British civilian or British home having been hit. On June 20, 1940, the German High Command announced that retaliatory attacks on military objectives in the British Isles had begun, although still on a minor scale. The warning was not heeded. The British air war against residential quarters was continued, reaching a climax in eight raids on Berlin, the first of which was carried out on August 26. The counterblow came in the night

from September 6 to 7, 1940, when the port and city of London shook for the first time under the impact of a concentrated German bombing. Up to the end of 1940, almost 45,000 tons of bombs were dropped on Great Britain, of which 43,000 tons were explosive bombs and 1,600 tons incendiaries.

The fact that the British started the bombing war is not as astounding as might have seemed at first sight in view of the patent inferiority of the British Air Force, both in quantity and quality, during the early stages of this war. Bombing had been resorted to by Britain for almost two decades to uphold "law and order" throughout the Empire. During the Disarmament Conferences, the British Government opposed all proposals aimed at banning the bombing weapon. And in a letter to the Editor of *The Times*, dated May 18, 1943, Lord Winster contradicted the assertions of an English newspaper that the air raids on the dams of German rivers, which had cost many civilian lives, had been suggested by a German refugee; he disclosed that a committee for the selection of bombing targets was formed years before the outbreak of war.

The British contention that the Germans started the bombing war on civilians by their attacks on Warsaw and Rotterdam is an attempt to sidetrack the issue, for both these places were in the center of military operations, were fortified and defended by troops, and had refused demands for capitulation.

The German campaigns in the Balkans and against the Soviet Union relieved the

British Isles of the immediate menace of German bombing raids and spared the British Air Force the heavy defensive losses in men and material it had sustained up to March 1941. It was thus able to train more personnel and increase aircraft production. Yet the increase in bomb-weight dropped on Germany and the occupied territories by the British Air Force during 1941 and even 1942 was comparatively small.

**Total Weight of Bombs Dropped by the  
British Air Force on the European  
Continent**

Year	Tons
1940	12,795
1941	31,185
1942	45,285

Hence the British dropped the same bomb load throughout 1942 as the Luftwaffe had dropped in the second half of 1940.

Except for the coastal districts and Western Germany, the territory of the Reich was not within the effective range of the bomber types then at the disposal of the RAF. American production was likewise not yet running at full speed and, after December 8, 1941, it had also to fill the tremendously increased requirements of the US Army and Navy. Moreover, the new long-range bomber types built in Britain and the USA had to undergo many changes before they could be produced in large numbers, while a huge personnel to man them had also to be trained. So it was not until 1943 that the Allied bombing of the Continent reached a high pitch. During that year, British planes alone dropped 157,165 tons of bombs, to which must be added the bomb load dropped by US formations. American crews had taken part in bombing raids since July 4, 1942, but, lacking fighting experience, they were at first only sent out together with British-manned planes in enterprises with fighter escort against the occupied western territories. Their first independent operations did not begin until the end of 1942.

**THE BRITISH AT NIGHT—THE  
AMERICANS BY DAY**

Since 1940 the British have, in their raids against Reich territory, adhered to

the principle of attacking at night. This seemed to assure their bomber formations—which had to dispense with fighter escort—of adequate protection without impeding their main purpose of spreading terror through “area bombing.” However, the gradual increase in the number of German night fighters and the improvement in their tactics forced the enemy frequently to change his methods. At first, British raids were carried out preferably on moonlit nights, later on dark nights, and recently there seems to have been a predilection for bad-weather nights. Ideal conditions for a British night raid obtain when the weather in the British Isles favors starting and landing, while there is an extended zone of bad weather over the Continent with low, thick clouds. Above the clouds, night bombers are comparatively safe from night fighters, especially when the latter must expect the formation of ice on the wings.

A change is also to be observed in the tactics used by the British Air Force. Up to the middle of 1942, the raids were usually carried out in several waves, each wave having to face the full force of the antiaircraft fire. Later on, the British command attempted to get all attacking planes over the target area within the shortest possible time, echeloned in height. This simultaneous mass attack was to force the defenders to direct their fire at varying ranges, thus reducing its effectiveness. These “bomber stream” tactics of flying in irregular yet joint formation, as well as various other maneuvers, such as feint attacks, have failed to cut down British losses.

The US Army Air Force, on the other hand, has been trained for daylight raids, the better to be able to make out its targets. Its theory was that heavily armored and armed bombers flying in close formation would need no fighter escort and yet be virtually invulnerable. But this proved erroneous. Notwithstanding their armor and weapons, the big American bombers suffered heavily. Since the end of September 1943, their formations have been protected by fight-

ers as far into Reich territory as their fuel supply would carry them. The defenders continued to take an increasing toll of US planes, reaching a climax on October 14, 1943, when, during an attack on Schweinfurth, the record number of 139 planes was shot down. On that day, the formation of "Flying Fortresses" was accompanied by "Thunderbolt" fighters as far as the Ruhr district; after that they were constantly attacked by single- and twin-motored fighters and rocket-bearing planes. Since that time the Americans have been employing more and more fighters to escort their bombers. In recent weeks, bombers have been protected by as many as twice or three times their number of fighters.

#### BOMBERS AND FIGHTERS

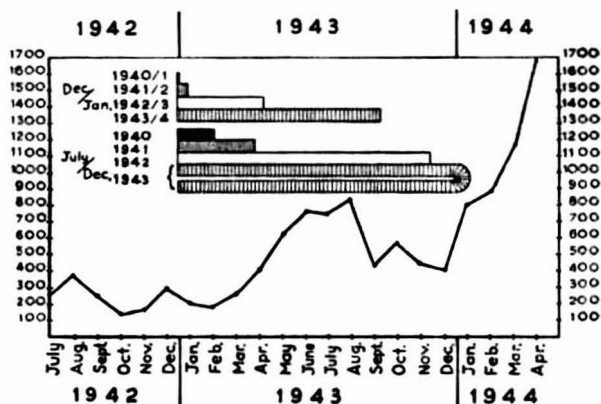
As a rule, the fighter escort flies in three groups: one accompanying the bombers to the objective, the second protecting the bombers over the target region, and the third accompanying them on the way back. Of course, this method requires some very fine timing, an especially ticklish job in bad weather. Since the Americans do not yet have a sufficient number of long-range fighters at their disposal, they have had to make shift with ordinary fighters equipped with extra fuel tanks fastened under the wings. To be able to carry the same armament over long distances in spite of this additional equipment, these fighters have to put up with a reduced speed. Moreover, since the extra tanks are highly explosive, they represent an added threat to the fighter when it is attacked. Consequently, the planes have an automatic device which allows the pilot quickly to cast off the extra tanks before taking on a German fighter. In that case the plane must rely on its normal fuel load and the pilot must keep his eye on the fuel gauge if he does not want to run the risk of coming down on German or Ger-

man-occupied territory because his fuel has run out. Often he has to break off the battle and abandon his bombers when his fuel supply runs low. Obviously the German fighters do not suffer from such a handicap, as they rise from airfields along the path of the bombers and near the target area and need not worry about their fuel supply in their maneuvers, being always able to land on one of the many airfields within short range.

Evidently the command of the US Army Air Force now also prefers to order major attacks when bad weather or low clouds are expected to hamper the defense. Diversion raids are carried out simultaneously, and sometimes night raids by the British and daylight attacks by the Americans have come in rapid succession, wherever possible from different directions and against different objectives, in order to split up and disorganize the German defense squadrons. If the Allied bombing raids on Europe have increased in scope and severity during the past year, the defenders have

#### Anglo-American Plane Losses Over Europe

(not including planes shot down over the Mediterranean battle fronts)



The curve shows monthly Allied losses of planes of all types in the air war against Europe since July 1942. The columns represent aggregate losses during the two-months' period of December/January and the six-months' period of July/December in four successive years since 1940. The figures were compiled from official German communiqués. They include only definitely ascertained losses and not losses caused by planes being interned in neutral countries or crashing unobserved by the defenders. The total number of planes destroyed during the period covered by the chart amounts to 11,912.

at least kept pace with them, if not done better. This can be seen from our chart of Allied losses in planes.

The significance of the chart is two-fold. On the one hand, it indicates that, seen as a whole, the monthly Allied plane losses show a rising tendency, apart from temporary declines, especially during the winter months, due chiefly to weather conditions disadvantageous to the defense. Actually the increase in air losses during the past two years is even more pronounced than indicated by the chart, inasmuch as the percentage of heavy bombers shot down has increased since the beginning of the air war. On the other hand, the mounting losses also mark the growing fury of the air raids on the Continent and the increasing hardship to which the civilian population of Europe is exposed. It is difficult to calculate the percentage of attacking planes shot down. While both attackers and defenders have had their ups and downs, most recent developments seem to have disproved predictions like that of General Arnold, the Chief of the US Army Air Force, who spoke last autumn of the crumbling German resistance and the declining plane output of the Reich.

The British and Americans have pinned such high hopes on their air war against Europe that a very substantial part of their war effort has gone into it, even to the neglect of other services. In a recent issue of the *Illustrated London News*, Cyril Falls, the well-known British military commentator, quotes Sir James Grigg, Secretary of State for War, as having stated that British heavy bombers have laid greater claim to the British productive capacity than everything that was required by the rest of the British armed forces.

#### THE COST OF BOMBERS

It has been estimated that the building of one four-engined bomber devours 300,000 working hours or, calculated on the basis of a 10-hour day including Sundays, one full month's work of 1,000 men. The mere replacement of the present aver-

age monthly loss of 1,000 heavy bombers, to which must be added at least another 50 per cent for ordinary wear and tear, emergency landings, crashing on the way back or when landing, and damages, would therefore require a standing labor army of at least 1,500,000 men in the production plants. To this must be added the labor needed for the replacement of fighter planes, quite apart from the requirements of the various battle fronts in the Mediterranean and Indo-Pacific areas. It goes without saying that the expenditure for the construction of manufacturing plants and of the planes themselves runs into astronomical figures, the cost of a four-engined bomber being estimated at around US \$300,000—500,000. This would mean the monthly cost of some half-billion US dollars in destroyed heavy bombers alone. Quite aside from the huge amount of labor, a large quantity of valuable material goes into the making of a four-engined bomber weighing 25 tons. The Germans have now taken to collecting bomber wrecks systematically for their scrap value and are obtaining considerable amounts of light metals, ball bearings, crankshafts, valve pipes of special alloy, etc., in this way.

Air armadas need plenty of spacious airdromes and ground installations. Nothing is known about the number of landing fields constructed in the United Kingdom except that they are said to have cost more than 3 billion US dollars. A report dated August 5, 1942, from Stockholm stated that 150 airdromes in Britain had been placed at the disposal of the US air forces.

Besides pilots, radio operators, and gun crews, air armadas also need a huge number of men for ground personnel and for supplies of all sorts. Last winter, the *Illustrated London News* wrote that some 100,000 men are—directly or indirectly—engaged in the preparing and carrying out of an attack of 800 bombers. According to a recent article in *Life*, no less than 38 men are kept busy in fitting out one US four-engined bomber. There is



the flying crew consisting of 4 officers (pilot, co-pilot, bombardier, navigator) and 5 men (2 radio operators, 2 engineers, 1 tail gunner). The ground maintenance crew of 11 (1 master sergeant and crew chief, 8 engine mechanics, 2 airplane frame mechanics) is supplemented by 7 specialists (1 each for instruments, radios, armament, parachutes, propellers, and 2 for electrical equipment), these latter being able to attend to several planes. Then come the bomb-supply crew of 5 and the gas supply crew of 4, and finally 1 dispatcher and 1 weather man. Considering further that bombs, munition, and fuel have to be manufactured and hauled over long distances, it is patent that the *Illustrated London News* is on the conservative side. To what extent manpower would be absorbed by a super-large air force was made clear by Capt. Eddie Rickenbacker, one of America's foremost aviators, when he urged the necessity of an American air force consisting of 300,000 pilots, 5,000,000 mechanics, and some 10,000,000 in other personnel.

The training of flying personnel not only involves considerable cost in time and money but, what weighs more heavily, entails a great deal of wear and tear on machines and other equipment. The cost of training a fighter pilot has been put by British quarters at roughly US\$150,000 and at about US\$200,000 for the training of a bomber pilot, while the training of a gunner would cost about one eighth of that amount. As regards training casualties, *Time* stated in its issue of January 24, 1944:

Before the war, 13 out of every 1,000 Army student pilots were killed in training. Since the war the fatality rate has risen to 20 in every 1,000 . . . . In flying training the rate of fatal accidents is about the same as before the war. But in combat training the rate has skyrocketed from 82 fatal accidents in every million hours of flying to 182. In combat training the fatality rate (a "fatal crash" may cause one or many "fatalities") jumped from 145 for each million hours to 521.

However, it should be noted that many US flight officers are only partially trained and have to rely on formation flying. They are directed by leader planes manned by pilots and navigators

whose schooling has taken from four to six years. This explains why so many US bombers go astray once their formations have been dispersed.

#### FUEL AND BOMBS

The consumption of fuel for mass attacks over great distances is very considerable. A single Lancaster bomber requires some 6,000 liters for a flight to the Ruhr district and back, i.e., a total of about 900 kilometers. If Berlin is to be attacked, the distance increases to 2,000 kilometers and the additional fuel required makes it necessary to decrease the bomb load. For their night attacks, the British have to provide fuel for their bombers only; the Americans, on the other hand, have to add the fuel used by the fighter escort.

In a raid on the German capital, a Boeing "Flying Fortress" of 4,800 hp carries a bomb load of about 2 tons. The accompanying fighters, some of which are of the twin-engine type, add another 4,800 hp, so that each ton of bombs to be dropped on Berlin requires 4,800 hp. Assuming that 500 bombers and 1,500 escort fighters participate in a daylight raid on Berlin, the fuel consumption would be about as follows. At a cruising speed of 350 kilometers per hour the flight would take some 6 hours, consuming for the greater part of the way about 50 per cent of the maximum power. Allowing for detours, as well as for maximum performance at starting and over the target area, we shall take 70 per cent of the maximum power as being the approximate average used for the entire raid. Calculating a consumption of about 250 kilograms of fuel per 1,000 hp per hour, the 4,800 hp of one bomber would absorb 7,200 kilograms of fuel in six hours or, at 70 per cent of the maximum performance, about 5,000 kilograms, to which must be added another 5,000 kilograms of fuel used by the accompanying fighters. 500 bombers and their fighter escort would therefore consume somewhere around 5,000 tons of fuel, i.e., the contents of a fair-sized tanker, for a single raid on Berlin.

## THE ARMY BEHIND

Before the recent intensification of the air war, the British were staging some eight to ten large-scale attacks every month in which, on an average, some 750 four-engined bombers took part; the Americans, who made 10 to 15 raids a month, usually employed 400 super-heavy bombers and 1,200 fighters on a venture. These figures allow us to estimate that the number of Anglo-American planes always kept in readiness for the war against Europe amounts to about 3,500 bombers and 2,500 fighters. The upkeep of such a force, calculated on the replacement figures of the first quarter of 1944, would require, at a conservative estimate, a standing army of more than 2 million men, viz.:

Construction of bomber replacements	1,500,000 men
"    "    fighter    "	100,000 "
Ground personnel, manufacture of ammunition, transportation of supplies .....	550,000 "
Meteorological service, training of flying and other personnel, replacement of training planes, etc.	100,000 "

It must be borne in mind that the cream of these men, namely the flying crews, has been exposed to rising casualty rates. As early as May 1943 the aviation expert of the *Evening Standard* estimated the British Air Force's loss in men at 47,000. If we disregard the relatively small American losses up to that time and add only the approximate casualties suffered by the Anglo-Americans between June 1, 1943, and April 30, 1944, in the air war over Europe, excluding the actual battle fronts, we arrive at a figure of more than 100 000 men.

The types of airplanes most often mentioned in reports on the Allied raids are

USA	British
4-engined bombers:	
Boeing "Flying Fortress"	"Lancaster"
Consolidated "Liberator"	"Wellington"
2-engined bombers:	
Douglas "Boston"	"Mosquito"
2-engined fighters:	
Lockheed "Lightning"	
Single-engined fighters:	
Republic "Thunderbolt"	Hawker
North American "Mustang"	"Typhoon"

## WHAT OBJECT ?

There can be no doubt that the Allied command has brought the full weight of the air war to bear on the Continent in order to crush the Reich. As far as the British Air Force was concerned, it was out to terrorize the civilian population and, by undermining the morale of the home front, to break German resistance. The first mass attacks on Lübeck, on the night of March 28/29, 1942, which marked the beginning of the large-scale destruction of German cities, shows all the features characterizing later raids. The center of the town was completely laid waste. The churches, the town hall, the old gates, the historic narrow streets, were converted into a heap of rubble by explosive and incendiary bombs. Many hundreds of civilians were killed and the cultural treasures of centuries destroyed. Long is the list of German and other European cities thus hit, but common to all these raids is the desire to terrorize, to unnerve the population.

Although some people in England still pretend that the British are seeking to bomb military objectives, they are contradicted not only by the effects of their bombing but by the less prudent utterances of leading men and journals. On October 24, 1942, Harold Balfour, Under-secretary of State, stated that he hoped the raids would "shatter the morale and the belief in the Führer." In a debate in the House of Lords, Dr. Bell, the Bishop of Chichester, regretted the indiscriminate bombing of big cities like Berlin and Hamburg. He said it had been admitted that the objective of such raids was the complete destruction of these towns, which could hardly be regarded as a legitimate act of war. According to the air expert of the *Daily Express*, British airmen dropped at least 70 per cent of their bombs in their night attacks on Berlin without seeing their targets. The very idea of "area bombing" excludes the target bombing of military objectives.

The US Army Air Force proclaimed the purpose of its daylight raids to be the destruction of the Reich's production

centers, boasting as it does of the "best bombing sight in the world"; it too, however, has aimed in the main at residential districts and city centers. If one considers that the US bomber squadrons usually appear at great altitudes or seek cover in clouds whenever possible, there can be no question of their taking proper aim. In February 1944, Lieutenant Colin Bednal, the *Daily Mail's* air expert, admitted that the Americans, who had arrived in Britain with delicate instruments in order to carry out precision bombing by daylight, had given up the idea and were now going in for "area bombing."

#### THE GERMAN DEFENSE

How has it been possible for the Germans to inflict such telling losses on the raiders? Naturally, large forces have been mobilized on the German side too. But they can hardly be compared to the forces used by the Anglo-Americans. First of all, fighter planes can be manufactured far more easily than bombers and are manned by one or two men. Moreover, as most of the battles take place over German territory, German losses in flying personnel are comparatively small, as those airmen who must bail out do not fall into the hands of the enemy. And secondly, the German anti-aircraft batteries are manned partly by boys not yet of military age, thus effecting a considerable saving in manpower.

The main weapon of the German anti-aircraft artillery is the famous 8.8-centimeter gun, but there are other types of even larger caliber. New searchlights with a diameter of 2 meters cast a beam of 15 kilometers and, if combined in batteries, penetrate as far as 20 kilometers. The number of AA guns employed in the defense of Reich territory is unknown, but in the middle of 1943 an American estimate already put it at 30,000. After the daylight raid on Berlin on April 29, 1944, one American gunner said on his return: "The flak was terrific. . . . Berlin must have flak guns in every street, every house, and every apartment."

Among the German fighter planes, the Messerschmitt 109 and the Focke-Wulf 190 are single-engined, while the Messerschmitt 110 is twin-engined. The first German night-fighter planes were also twin-engined two-seaters; but a new single-engined single-seater night fighter has been developed and proved successful. It is nicknamed the "Wild Boar." New tactics have been tried out, just as new arms have been employed against the raiders. Rocket cannons have been mounted on twin-engined fighters, firing explosive salvos as well as fog rockets which caused some of the attackers to collide. American pilots reported fire bombs being towed by German planes by means of cables and being exploded near the "Flying Fortresses." Night raiders found themselves spotted in the light of whole series of flares forming luminous paths, in which they were attacked by the Germans. Here is the description of an American daylight raid as it appeared in *Time*, January 24, 1944:

Almost from the start, the mission was hell in the heavens. The Germans attacked over Holland's Zuider Zee, never stopped for long. They used tactics and strength which they must have been cautiously hoarding for pre-invasion battles.

A flight of 32 Messerschmitts and Focke-Wulfs tackled a leading squadron of Thunderbolts. Other German fighters bored straight through at the bombers. First, four Focke-Wulfs; then 30; then 12; then they poured in, slamming through the tight gun-studded bomber formation without even rolling over.

The first enemy waves had the job of breaking up the bomber squadrons. Rocket-firing planes stayed out of gun range, fired broadsides from formation. To the U.S. crews, the battle at this stage had a weird naval quality. A Fortress gunner watched a group of 18 twin-engined Me-110s circle from the rear, fly up in line three-quarters of a mile away; then, like torpedo boats, execute a superb 90-degree turn and lob their rockets simultaneously—"a broadside of rockets that seemed to burst in an unending line of red and yellow fire." Some bombers were under continuous attack for as much as 90 minutes; 24 hours later the men were still tense and grim-eyed, haunted by the strain of battle.

#### PILOTS' NERVES

This last reference points to an entirely new aspect affecting the problem of flying personnel. In a recent article in *Air News*, Frederick Sondern, Jr., describes the work and experiences of physicians assigned to the American air

squadrons in Britain. The strain on bomber pilots is apparently particularly great, and after 100 hours of bomber flying the physicians have to look for symptoms of overstrained nerves in the pilots. One of the doctors explained this fact as follows: let us say that the task requires 10 hours, 5 hours each way. Have you any idea of what it means to fly 5 hours with every nerve as taut as a fiddle string? When the pilot approaches his goal, hell is let loose below, above, and around him; but he must get there with the accuracy of a calculating machine and provide his bombardier with the absolutely straight course needed for using the bomb sight and releasing the bombs. Then comes the nerve-racking job of looking out for damaged comrades who need protection while they try to limp home. The following 5 hours, the flight back—in constant danger of fighter attacks—are endless. Figure out all that he has used up in nerve strain, and realize that all this time the pilot has had no relief for his tension. The fighter pilot can at least see what he hits, he can do a lot of fancy flying and in this way blow off some of the steam in his nervous system. But the bomber pilot, as well as the rest of the crew, must sit and sit for hours on end, waiting for the few minutes of concentrated hell. Look at a bomber crew when they come back from an assignment. The information officer whose job it is to squeeze details about the flight from these fellows usually has a hard time pumping them. They have not the least inclination to talk, all they do is sit and gulp down their food, fall into bed, and sleep well into the next day.

The doctor told Sondern of a typical case. In one pilot he noticed signs of overstrained nerves and suggested that he should take a short vacation. The pilot, however, was reluctant, as he was afraid of spoiling his chances of long leave if he took a vacation now. The physician continued: "I gave in—a mistake I shall never make again. The following day came the breakdown, in

the midst of the attack. He simply lost control over his plane, flew around like a wounded bird, and had his ship badly shot up by the Luftwaffe. Not until the last moment, when he was six or ten feet above the water, did he get hold of his plane again and somehow managed to get home. 'Doctor,' he said to me, 'the devil knows what happened. Suddenly I started to sweat and tremble like an aspen leaf. I wasn't afraid, but I felt as if I had turned into jelly.'" The doctor added: "This fellow will never be able to touch a plane again. His nerves have cracked."

#### AND THE RESULT?

What effect have these gigantic efforts on the part of the British and Americans had? As for the German supplies in arms and other war material, the Allies themselves have not been able to claim any noticeable decrease as the result of their air raids. And as for the second object of the raids, the breaking of the civilian morale and the German people's will of resistance, we shall quote from a recent article appearing in the *Neue Zürcher Zeitung*, a Swiss daily that can hardly be accused of pro-German sentiments. In a lengthy description of how Berlin was bearing up under the almost continuous raids since November 22, 1943, the Berlin correspondent of the paper writes:

After the large-scale raids of the last few months, enough experience has been gained to justify a detailed observation of the political effect of the air war. We do not know what the future has in store; but at any rate, one thing is certain: so far the morale of the population has stood up well. The will to fight has remained unimpaired. Any impartial observer is bound to confirm this. Of course, the Government is faced by numerous difficulties in organization and war economics; but its political position has not been weakened—in fact, in a certain sense it has even been strengthened. For the vast majority of the bombing victims believe that victory alone will give them back at least a part of what they have lost. This links these people even closer to the fate of National-Socialism. It provides them with the energy to exert their utmost effort for the war which, incidentally, no German, whatever his political convictions may be, would wish to see lost. The British have, politically speaking, definitely lost a lot of ground, a fact which is only natural. A family losing all its possessions through a bomb directs most of its curses against those who have dropped it.